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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/589,168	06/08/2000	Makoto Harada	04329.2314	9765
22852	7590	03/02/2004	EXAMINER	
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 1300 I STREET, NW WASHINGTON, DC 20005			ELVE, MARIA ALEXANDRA	
			ART UNIT	PAPER NUMBER
			1725	

DATE MAILED: 03/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/589,168

Applicant(s)

HARADA ET AL.

Examiner

M. Alexandra Elve

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/00, 6/02</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 & 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lofredo (US Pat. 4,012,490) in view of Foster et al. (US Pat. 4,163,775).

Lofredo discloses a system for separating and removing off-gases from a reactor. The off-gases pass through a recombiner wherein oxygen, nitrogen oxides and hydrogen form water. The resulting oxygen-free stream from the recombiner contains nitrogen, water, hydrogen and carbon dioxide and so forth. This it then passed through cryogenic distillation yielding an effluent gas that is essentially nitrogen and hydrogen. Hydrogen and oxygen are recombined using a catalytic reaction and forming the easily removable water. Catalysts may be noble metals, such as platinum or palladium on an inert substrate. Nitrogen oxides may also be reduced in the recombiner using catalysts such as rhodium. Following the recombination reactions, the remaining streams are nitrogen and hydrogen, which may be liquefied or re-circulated. Other materials used in the system are molecular sieve (artificial zeolites), silica gel, alumina and the like. (abstract, col. 2, lines 1-21, col. 3, lines 19-45, col. 4, lines 10-45, col. 7, lines 1-35, col. 6, lines 26-64)

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Lofredo does not teach ammonia synthesis, catalyst bed amounts, catalyst carriers and associated surface areas and co-catalysts.

Foster et al. discloses the synthesis of ammonia from hydrogen using a catalyst supported on graphite. The active part of the catalyst component is made up of a transition metal (0.1 to 50% by weight) and a modified metal or ion selected from the alkali or alkaline earth metals or ions (0.1 to 4 times by weight). Transition metals are chosen from the groups VB, VIB, VIIB, VIII elements on the periodic table. Preferred transition metals are cobalt, ruthenium and rhodium. The surface area of the catalyst is in the range of 100 to 3000 m<sup>2</sup>/g. Additionally, lanthanide may be used as a catalyst. The catalyst may contain 16.6% ruthenium and 9.6% by weight potassium (approx. 26% by weight total). (abstract, col. 2, lines 18-65, col. 3, lines 65-68, col. 5, lines 5-10)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the ammonia synthesis and catalytic components and amounts, as taught by Foster et al. in the Lofredo system because the catalytic components are standards in the industry and the ammonia synthesis is a way of dealing with the hydrogen and nitrogen from the perspective of neutralizing reactor wastes.

Claims 8-10 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lofredo and Foster et al., as stated in the above paragraph, and further in view of Chakraborty (US Pat. 5,495,511).

Lofredo and Foster et al. does not teach the shape and placement of the catalyst.

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Chakraborty discloses passively inerting the gas mixture forming in the reactor containment of a nuclear power plant. Catalytic recombiners remove hydrogen. Nitrogen is present in the reactor containment area. Numerous catalytic components (borax, potassium compounds, manganese compounds are some examples) are contained in a cylindrical cartridge inside the reactor environment. A grid like structure contains the catalyst components. (abstract, figures 1-4, col. 1, lines 30-35, col. 2, lines 40-50, col. 3, lines 25-30, col. 4, lines 16-58, col. 5, lines 25-67, col. 8, lines 6-12)

It would have been obvious to one of ordinary skill in the art at the time of the invention to contain the catalytic inerting compounds inside the reactor and in a cylindrical shape, as taught by Chakraborty in the Lofredo and Foster et al. system because the off-gases should be dealt expeditiously, especially in a nuclear containment emergency. Additionally, cylindrical shapes lend themselves to fast and more complete reactions.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See US PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 6:30-3:00 Monday to Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on 571-272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

February 21, 2004.



M. ALEXANDRA ELVE  
PRIMARY EXAMINER